Space Weather Forecast

Issued on Sunday, 28 July 2024 at 13:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: G1-G2/Minor to Moderate Storms expected into Day 2 and Day 3 (29-30 Jul) with a chance on Day 4 (31 July) given potential CME (coronal mass ejection) arrivals. Isolated R1-R2 Minor to Moderate Radio Blackouts expected throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with several M-class flare, the largest of which was an M9.9 peaking at 28/0158 UTC from the cluster of regions located in the southeast, likely near AR3766. A further M7.7 flare was observed peaking at 28/1042 UTC.

There are currently up to nine sunspot regions on the solar disc. AR3762, in the southwest quadrant, remains the largest and most complex region. Its trailing portion has weakened and decreased in size. It continues to exhibit a delta configuration. The cluster of sunspot regions transiting across the southeast quadrant continues to grow in size and complexity, with intricate magnetic looping bringing additional instability. AR3768, in the southwest quadrant, grew significantly, with the appearance of a couple of spots with penumbra. The as yet unnumbered region in the northeast is continuing to develop. All other remaining regions appear small, simple and/or largely unchanged.

Associated with the M9.9 was a CME, which likely coincided with possibly as many as two other CMEs around the same time. This has made analysis very challenging, early results suggest it is slow moving, but may have an Earth-directed component with an arrival during the second half of the 31st July UTC day (day 4). Further analysis will be required for a more confident forecast.

A partial halo CME was observed shortly after 27/0600 UTC. It may be attributed to AR3762 since dimming was observed at a similar time but the signal is contaminated by the large far-sided event, resulting in a low confidence analysis with an arrival at Earth possible at the end of 29 July or beginning of 30 July UTC days (days 2 and 3).

Solar Wind / Geomagnetic Activity: Solar winds have steadily declined through the period, from 450 km/s to below 400 km/s. The Interplanetary magnetic field, Bt, was weak as was the north-south component, Bz. Resulting geomagnetic activity was generally Quiet to Unsettled (Kp 1-3), with an Active (Kp4) interval observed between 27/1200-1500 UTC.

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to be Moderate with further M-class flares expected and slight chance of isolated X-class flares.

Solar Wind /Geomagnetic Activity: Current solar wind speeds are thought expected to remain at slow levels over the next 24 hours. Geomagnetic activity is therefore expected to be generally Quiet to Unsettled at first but to increase to G1-G2 Minor to Moderate storm conditions at the end of Day 2 and into Day 3 (29-30 July), with a slight chance of G3 Strong Storm given the potential for the aforementioned CME arrival. The risk continues into Day 4 (31 July).

Energetic Particles / Solar Radiation: Solar radiation is most likely to remain at background levels. However, there is a slight chance of rising above the S1/Minor Radiation Storm threshold in response to any notable flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	60	60	40
Strong	G3	No	1	20	15	1
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.